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July 2008

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Recommended Citation

Yang, Song; Kurnia, Sherah; Lee, Heejin; and Kim, Seongcheol, "MOBILE PHONES AND SOCIAL CAPITAL: A PRELIMINARY STUDY IN SOUTH KOREA" (2008). *PACIS 2008 Proceedings*. 138.

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THE IMPACT OF MOBILE PHONE USE ON SOCIAL CAPITAL DEVELOPMENT: A PRELIMINARY STUDY IN SOUTH KOREA

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Abstract

Social capital is one of the influential concepts in social science to understand contemporary societies. It has been found to influence many aspects of social life, directly or indirectly. It is also increasingly explored in relation to Information and Communications Technology (ICT). Nevertheless, social capital is a challenging variable to research, in part because of its multiple divergent definitions and measures. This paper presents and conducts a preliminary test of a model for understanding how ICT affects social capital. The model hypothesizes that the changes in social capital caused by ICT result from some degree of mobility in social interaction obtainable by using ICT over time. Principally, three types of mobility – temporal mobility, spatial mobility and contextual mobility – are identified. The preliminary test, using mobile phones as an example of ICT, was conducted in South Korea, which is one of the leading countries in mobile technology development. All three types of mobility are found to be important in explaining the impacts of mobile phones on social capital.

Keywords: Social capital, Mobile phones, Mobility, Korea.

1 INTRODUCTION

Social capital has recently gained importance in a variety of research fields. The central proposition of social capital theory is that “social networks have value” (Putnam 2000, p. 19). That is, social networks constitute valuable resources, which facilitate certain actions of participants within the networks (Bourdieu 1986, Burt 2001, Coleman 1990, Portes 1998, Putnam 2000). Initially, this term was used mostly in sociological and political discourses, but it has lately been applied in other fields, and become an influential concept in understanding the contemporary world. Since people’s relationships matter greatly to themselves as individuals and as members of communities, social capital has been found to influence many aspects, such as the development of human capital (Coleman 1988), quality of life (Kennelly et al. 2003), health (Liukkonen et al. 2004), economic performance (Baron et al. 2000), and innovation diffusion (Fountain 1997).

With the development of Information and Communications Technology (ICT), the interaction between ICT and social capital in organizations or society at large have caught both researchers’ and policymakers’ attention. However, studies in this area are still very limited and do not produce consistent results. Few agreements on the role of ICT in social capital building have been reached to date. Some researchers believe electronic technology contributes to the decline of social capital based on analyses of the impact of TV (see Putnam 2000 as an example), whereas others argue that technologies, such as the Internet, facilitate social capital building (see Hampton et al. 2003 for example). This indicates that inadequate knowledge has been acquired regarding the relationships between ICT and social capital. Hence the research question posted in this paper is: *How does ICT affect social capital?*

For the purpose of this study, we define social capital as an individual’s network of social relationships and the qualities of those relationships, which enhance the ability of participants to associate with each other for mutual benefits. Therefore, social capital is not simply related to the extent to which people are connected to others, but also to the nature of those connections. Although investigations about connection between social capital and technology are now prevailing, few academic studies have attempted to define a model that explicitly describes the mechanism of this interaction. The goal of this paper is to present and conduct a preliminary test of such a model. Specifically, this study chooses mobile phones as an example of ICT to test the model. By combining mobile phone research with social capital and mobility theories, this study enriches our understanding of the role of ICT in general, and mobile technology in particular, in societal development. For practice, this research contributes by providing policymakers with insights into the possible merits of the rapidly developing mobile technology in building healthy communities. The findings from this study might assist policymakers in designing supplementary means to cope with current challenges to the establishment of e-Government. In the remainder of this paper, six propositions regarding ICT – social capital interaction are synthesized based on the literature, and then assessed using data collected in South Korea, which is one of the leading countries in mobile technology development. Finally, implications for further investigation are discussed and conclusions are drawn.

2 LITERATURE REVIEW

2.1 Social Capital Theory

The concept behind social capital is nothing new in sociological research (Field 2003, Portes 1998). Classical social theories, such as works of Durkheim and Marx, already suggest that the involvement and participation in groups can have positive consequences for individuals and communities (Portes 1998). The first systematic analysis of social capital was made by Pierre Bourdieu (1986) and a clear theoretical framework was developed by James Coleman (1988, 1990) who is the first to conduct the

empirical investigation on this concept (Baron et al. 2000, Field 2003). It is Robert Putman who correlates levels of social capital with traditional public policy concerns and successfully exported the concept out of academia into a wider media (Baron et al. 2000, Field 2003).

In recent years, research on social capital is growing fast across many social science disciplines, such as sociology, politics, public health and economics, among others. One study of the social science literature found that the number of journal articles listing social capital as a keyword was 20 before 1981. This had risen to 109 between 1991 and 1995, and 1003 between 1996 and March 1999 (Baron et al. 2000).

Although researchers in different disciplines agree on the significance of relationships as a resource of social action, they lack an agreement on a precise definition on social capital. To a certain extent, the definitions vary depending on the level of analysis that corresponding theories involve (Portes 1998; 2000). Studies of social capital can be roughly grouped into two categories: individual social capital and collective social capital. Some theories, such as those by Bourdieu (1986) and Coleman (1990), mainly regard social capital as resources generated by an individual's social network for his or her mutual benefits. Social capital defined from this point of view is labelled as individual social capital (Portes 2000). Others, such as those by Putnam (2000), consider social capital as both people's social network and their moral attitude or social norms contributing to the common good of a whole community or even a nation. Social capital defined from this approach is referred to as collective social capital (Portes 2000).

2.2 Research on Social Capital and ICT

Currently, great efforts are being made to explore the influence of ICT on society. At the same time, some IS researchers increasingly become aware of the important role of social capital in technology development and knowledge sharing processes (Fountain 1997).

To locate publications on social capital and ICT related topics, this study carried out keyword searches across a large range of databases on Information Systems, Sociology, and Political Science. The reviewed studies examine the relationships between social capital and ICT from two different angles distinguished by the role of social capital in research design, which is concerned with whether social capital plays the role of a dependent variable or of an independent variable in examining the relationships. For example, some studies focus on the impacts of ICT on social capital building and maintenance (social capital as dependent variable), whereas others on the effects of social capital (social capital as independent variable) on the development and use of ICT.

As stated in Section 2.1, the unit of analysis, which is concerned with whether the social capital concept is defined as an asset of an individual or a feature of a community, is an important criterion for classifying the studies of social capital. By intersecting the two criteria (the unit of analysis and the role of social capital in research design), four categories of the social capital and ICT research can be identified. We, then, place representative studies into each category and map the current state of the research in the area. For brevity, only three example studies in each category are displayed in Table 1. A full list of the reviewed studies with further discussions can be found in Yang et al. (2007).

Based on the number and variety of articles discussing some aspect of ICT and social capital, there appears to be a strong interest in understanding the relationship of ICT and social capital. It is commonly agreed that social capital is positively related to the development, adoption and use of ICT, at both individual and collective level. However, it gives rise to much controversy about the role of ICT in social capital building and maintenance. Specifically, the reviewed studies provide a rich narrative of how different patterns of ICT use, typically TV and the Internet use, impact on collective social capital measured by civic participation, trust, social norms, etc., but the impacts of ICT on individual social capital are widely ignored.

Based on the literature review, we identified some issues related to social capital studies. First, the majority of social capital studies relevant to ICT deal with the collective social capital, whereas much

fewer studies pay attention to the individual social capital. Second, findings from previous studies about the impacts of certain ICT on social capital are hard to generalize. Moreover, no research explains why and how the changes of social capital occur due to technology use. Therefore, in this paper, we choose mobile phones as an example of ICT to find out how mobile phones affect the individual social capital. We also propose framework to systematically explain the mechanism of the mobile phone-social capital interaction.

Role of SC Level of analysis	Dependent variable	Independent variable
Individual	Connecting SC Haythornthwaite (2001) Reich et al. (2003) Drentea et al. (2005)	Influencing Social Capital Gargiulo et al. (2000) Anderson (2004) Lin et al. (2006)
Collective	Changing Social Capital Norris (1996) Hampton (2003) Huysman et al. (2006)	Enabling Social Capital Fountain (1997) Han (2002) Hsieh et al. (2006)

Table 1. Four categories of social capital and ICT studies

3 RESEARCH MODEL AND PROPOSITIONS

As we mentioned early in this paper, scholars in different disciplines lack an agreement on a precise definition about social capital. However, majority of the reviewed literature highlights the importance of social interaction in building and maintaining social capital (e.g. Bourdieu 1986, Burt 2001, Lin 1999, Putnam 2000). As Lin (1999) states, “The premise behind the notion of social capital is rather simple and straightforward: investment in social relations with expected returns. (p. 30) ... Individuals engage in interactions and networking in order to produce profits. (p. 31)”. This consensus provides us a juncture in linking social capital, at both individual and collective level, and ICT, which enables human beings greater capability in social interaction than ever before.

ICT, including mobile technologies, are developed to extend human communication capability by breaking through the limits, such as time difference and geographical distance, and enables human interaction with greater mobility than ever before. Kakiyara and Sorensen (2002) argue that ICT, particularly mobile technology, is continuously reshaping human interaction. This interaction is the precondition of social capital maintenance and recreation (Lin 1999). Social capital is productive but it can be depleted if it is not renewed (Coleman, 1990). It inheres in social networks, which are the structure of relations among actors. Social networks, however, are not a nature given and must be constructed and renewed through investment strategies oriented to the institutionalization of relations (Bourdieu, 1986). Social interactions are effective strategies for constructing social networks and creating trustworthiness and norms of reciprocity. Mobility, which facilitates and transforms social interaction, therefore, is central to gluing social networks together and can help to avoid social exclusions that reduce social proximity and social capital (Urry, 2002). Therefore, we propose that the degree of mobility obtainable by using ICT is the mechanism through which ICT affects social capital.

While many studies consider mobility as human independence from geographical constraints (Urry 2002), Kakiyara and Sorensen (2002) expand and deconstruct this concept to embrace temporal, spatial and contextual mobility by relating mobility to interaction.

Temporal mobility is concerned with the increasingly mobilized human interaction in terms of time. The temporality of human interaction is now highly mobilized into multiple temporal modes and can no longer be explained from a linear “clock-time” perspective. This leads to a complex social environment where monochronicity and polychronicity of interaction among humans are intertwined

and renegotiating with each other (Kakihara and Sorensen, 2002). Monochronicity refers to situations where people only focus on one activity at a certain time, while polychronicity signifies situations where people deal with several things at the same time (Hall, 1983, Kakihara and Sorensen, 2002).

Spatial mobility refers not only to the wide-ranging geographical movement of people, but also to the mobility of objects (such as mobile phone and Walkman), symbols (such as information, sound and image) and space itself (such as virtual spatiality, that is, “virtual community” dissolves the geographical boundary) (Kakihara and Sorensen, 2002).

Contextual mobility refers to a relative freedom of contextual constraints of interaction. Human actions are essentially situated in particular contexts. Those contexts include people’s cultural background, particular situation or mood, degree of mutual recognition, and so on. In face-to-face interaction among people, conformity of such contextual aspects is very important, while by using ICT applications and mediated communication media, people can easily interact with others regardless of the contexts (Kakihara and Sorensen, 2002).

Using Kakihara and Sorensen’s analysis of mobility as starting point, time, space and other contextual issues in ICT-social capital interaction are considered in turn. Specifically, mobile phones are employed as an example of ICT for better understanding of this issue in this paper. They are chosen for two reasons. Firstly, mobile phones synthesize many features of previous information and communications technologies. With the development of mobile data services, mobile phones may be used as radios, TVs, MP3 players, and much more. A generalized model based on an investigation of mobile phone use is expected to be plausible to represent many other, although not all, technologies. Secondly, mobile phones are diffusing around the world faster than any other to date. Besides voice calling, use of the mobile phones for data services, such as Short Message Service and mobile Internet, has become a significant social phenomenon. Srivastava (2005), who explores societal and human implications of advances in mobile phones, argues that human identity and social interaction in our society have changed because of the heavy use of mobile phones. These changes may lead to changes in people’s social relationships and in resources generated by those inter-personal relationships - that is, social capital.

- **Time**

Time is one of the fundamental parameters of the orderliness characterizing human involvement with the world. However, it means different things to different people in different situations. Zerubavel (1981) proposes that human actions are with “socio-temporal order”, a structure mapped by sequences, durations, temporal locations and rates of recurrence. Sequence is the order in which events typically occur. Duration is how long events or situation last. Temporal location refers to when the events usually occur, and rate of recurrence is about how often the events occur. Those “cycles, rhythms, beginnings, endings and transition points not only support a social structure’s aura of objectivity and predictability but also aid us in defining our roles, our obligations and the tenor of our relationships”(Barley 1988, p.125). The analysis of socio-temporal order can also help us understand Monochronicity vs. Polychronicity in human behaviour. Mobile phones enable people not only to exchange information fast and save time, but also communicate with people while doing something else. It potentially facilitates users’ social interaction, which plays fundamental role in social capital formation (Putnam, 2000). Therefore, we propose,

Proposition 1a: Mobile phone use is positively related to an individual’s perceived temporal mobility

Proposition 1b: Temporal mobility obtainable by using mobile phone is positively related to an individual’s social capital development

- **Space**

Studies have shown that the spatial mobility helps people overcome interaction difficulties caused by spatial separation, which facilitates the construction of social networks and receipt of social support

(Cook and Weigel, 1983, Kakiyara and Sorensen, 2002). The use of technologies for mobility involves changes in the modes of space. Take mobile technology for example, information and messages can be sent to a mobile phone regardless of its location. Wellman (2001), thus, views wireless communications as expressing a new phase in social communications and networking. He termed non-technological communication as door-to-door communications, the automobile and the telephone communications as place-to-place, while wireless communications as person-to-person ones detached from household location and its communications infrastructure. Such changes permit the overcoming of space through time at growing speeds. Those feature of mobile phones indicate great potential in enhancing users' spatial mobility (Kakiyara and Sorensen, 2002). We accordingly propose,

Proposition 2a: Mobile phone use is positively related to an individual's perceived spatial mobility

Proposition 2b: Spatial mobility obtainable by using mobile phone is positively related to an individual's social capital development

- **Other Contextual Issues**

Besides time and space, other contextual factors, including people alongside the mobile phone users when communicating, mood of the users and purpose of the communication, are also needed to be considered. ICT influences the contextuality of interaction in various ways. For example, teenagers may prefer to use SMS because they are in public, where voice calling may be not appropriate. Kakiyara and Sorensen (2002) further argue that computer mediated communication can provide people with access to a wider range of weakly tied actors and a wider set of contacts, extending communication possibilities beyond various contextual constraints. Based on this point of view, ICT can make interaction easy by conquering some obstacles in face-to-face interaction. Therefore, ICT can increase users' contextual mobility, and enhance their social capital. In summary, we propose,

Proposition 3a: Mobile phone use is positively related to an individual's perceived contextual mobility

Proposition 3b: Contextual mobility obtainable by using mobile phone is positively related to an individual's social capital development

Besides the time, space and contextual issues discussed above, mobility obtained by using ICT may differ among people of different ages, genders and socioeconomic status (Ling et al. 2001, Haddon et al. 2002, Cook et al. 1983, Oksman et al. 2004). Individuals' social capital may be also different because of those demographic characteristics (Cook et al. 1983, Cox 2002). Oksman et al. (2004), for instance, point out that the function of mobile communication for teenagers is different from adults. All these and other factors are worth dwelling.

The above propositions constitute the research model of this project as depicted in Figure 2.

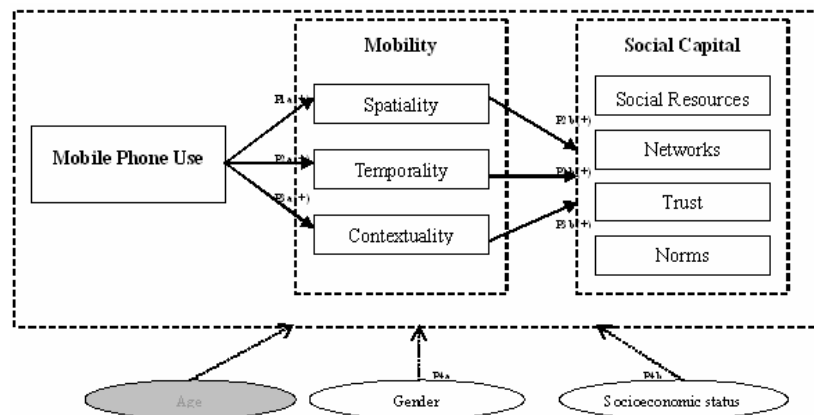


Figure 2. Preliminary Research Model of Relationships among Mobile Phones, Mobility and Social Capital

4 RESEARCH METHODOLOGY

To test the above propositions, an empirical investigation was conducted in South Korea. South Korea has the fastest-growing mobile penetration rates in the Asia-Pacific region and the largest penetration of mobile Internet users in the world. In 1999, its number of mobile telecommunication services subscribers surpassed that of fixed-line subscribers, while it is predicted that demands for wireless access will exceed the number of fixed access lines by year 2010 in the world. It is also the first country introducing CDMA and distributing 3G services. Findings from South Korea can provide good lenses for better understanding in the social consequences of mobile technology.

Only individual social capital, which is concerned with the resources embraced in social networks that may benefit parties within the networks, was targeted. Individual social capital is based on social network. Two elements of social capital identified by Lin (1999) are accessibility (network locations and resources) and mobilization (use of contacts and contact resources). How the quality of our participants' social networks and the way they mobilize resources embraced in these networks influenced by mobile phones are fundamental issues should be examined in this study. Therefore, the proposed research question - how does ICT affect social capital - turns to two closely related sub-questions in practical: (1) do mobile phones help people to maintain as well as extend their current social network? and (2) do mobile phones help people to use the resources in their social network? To answer these two sub-questions, we identified three types of social relations that matter greatly to social capital: relationship with family members, with friends and with acquaintances. These three types of relations cover all the associations of an individual in his/her direct social networks (Van der Gaag et al. 2004).

All three types of mobility (i.e., temporal mobility, spatial mobility and contextual mobility) are recognized. However, time, space and contextual aspects of any social activities are very difficult if not impossible to separate completely. For example, when a person sends a SMS in the morning on a train and explains that he/she uses SMS instead of voice calling because there are many people around and he/she thinks it is impolite to talk. How do we judge this activity? All three types of mobility relevant here. We identify the three types of mobility is to get a comprehensive picture about mobility obtainable by using ICT, since most previous research about ICT and mobility only concerns physical movement (part of spatial mobility defined in this study). What we want to confirm in this study is that, by breaking through the temporal and spatial barriers and avoiding some of the contextual inconvenience of social interactions and communication, mobile phones may push connections between people for mutual benefits, namely social capital.

Currently, there is some knowledge obtained through previous research on topics related to the mobile phone - social capital interaction, most likely through quantitative survey method. However, in-depth understanding and explanation about the linkage between technology and social capital issues is lacking. The exploratory and explanatory purpose of this study is further confirmed by the "how" questions posed. Because of the complication of the social behaviour issues targeted in this project, methods that can provide rich and comprehensive data are much needed. Therefore, it is considered that interpretive, qualitative method(s), which is appropriate for both exploratory and explanatory research should be employed for this project. Specifically, diary-interview method was chosen as the most appropriate for this study. This method combines diaries in which participants record their activities in a certain period and brief interviews where participants are required to explain the activities they fill in the diaries (Zimmerman and Wieder, 1977). For phenomena that are not suitable to direct observation, diary-interview method may serve as a good substitute technique.

The target population of this project is full-time undergraduate students. Young people are target based on the findings from previous research that age is the most significant determinant factor in mobile phone acceptance. They are the most active mobile phone users and significantly different in terms of social capital perceptions with the teenagers and the professionals (Cox, 2002). Students are

chosen for their easy of access. With the valid and reliable instrument developed in the project, this study could be extended to a large population.

During the data collection process, each participant is required to attend an initial interview which included a questionnaire about mobile phone usage in general including their attitudes towards mobile phone use and social relationships, with an instruction about how to complete a mobile-phone-use diary. They, then, complete a seven-day diary listing his/her mobile phone use in one week time. The diary form was developed based on the previous studies employing the diary-interview method. It was used to (a) present the essential information about the communication using mobile phones, including the context within which the communication takes place and the information of the communication itself, i.e. what it is, its duration, involved parties and purpose, and (b) provide a simple format for analysing the use of mobile phones. After finishing the diary, each participant need to attend a one hour follow-up interview to clarify the activities filled in the diary. They are also asked about their feelings towards the mobile phones as well as the effects mobile phone had on their activities.

Because of the fixed-structure of the questionnaire (initial interview), diary and transcripts of the follow-up interviews, the coding of the data is straightforward parallel to open-end quantitative data. A code-book was developed based on previous research on social capital, mobile phone use as well as time-diary. The data was coded accordingly.

5 FINDINGS

A total of sixteen students, ten females and six males, aged from 19 to 26 (western age) with various family backgrounds, participated in the project. Only one male participant (named as M below) was married when the data were collected. The participants were from four universities in three cities. The universities and the students were chosen based on the convenient sample method. Although the sample was not randomly chosen, the mixture of universities with different backgrounds, quality and locations and the variety of students' background make the sample be representative among Korean university students.

5.1 Do mobile phones help people to maintain as well as extend their social network?

Our participants are full-time undergraduate students. They usually organize their activities around a stable schedule, which permits them to better control their accessibility. Moreover, their social networks are relatively narrow, which mainly include family members, friends and some acquaintances, such as professors in the universities they attend. When asking how they felt about the role of mobile phone in maintaining their relationships with their family members, friends and acquaintances (on a scale of 1 to 5, where 1 means to a very small extent and 5 means to a very large extent, Question 9, questionnaire, initial interview), the average scores are 2.81, 4.31 and 3.19 respectively. Whereas for the question regarding the role of mobile phone in making new friends or meet people, the average scores are 4.25 and 3.63, respectively. The male participants, except one gave 5 to the role of mobile phone in keeping relationships with acquaintances and meeting new people, typically think that mobile phones play limited role in their relationships with acquaintances, while the females are much more optimistic about the effects of mobile phones.

For most participants, the mobile phones significantly affect their relationships with family members, although the phones make communications more convenient if they are not at home. Some of the participants even reduce the phone use during the weekends, so that they can spend more time with their family. One exception is M, to whom mobile phone is the most important tool to keep in touch with his new-married wife. His diary indicates that they frequently send each other SMSs and make phone calls. He admits that mobile phones, especially SMS, enable them contact each other regardless of time, physical location, what they are doing and who are around. It means a lot to them emotionally.

In terms of developing and maintaining friendships, all participants agree that mobile phones are very important. Consistent with previous studies, our data show that by offering fast-paced, inexpensive communication, mobile services, especially SMS, are used by the participants for evolving their social networks. Different with other communication technologies, such as online communities (e.g., CyWorld), emails and instant messaging (e.g., MSN), it is unlikely that any pure online relations could be established. The participants mainly used mobile phone to enhance communication with people they are familiar with, make plans with friends and maintain social contacts outside of their day-to-day, face-to-face conversations. The ability to communicate at non-traditional times and places are added motivations for using mobile communications. As one participant explained:

(Researcher: In your diary, you frequently contacted with your friends “for fun”. What do you mean by “for fun”?)

(“For fun” means) no particular purpose, just to say, “Hello, how are you?” ... It was to keep relationships with my friends. I had experiences that I did not contact an old friend for a long time, and he even deleted my phone number. When I called him again, he asked, “Who are you?” I don’t want that. I keep in touch with them (my friends). I can do it whenever and wherever I want, say, sending a SMS. ...SMS is better than calling. You know, it’s cheap, and anytime, anywhere, not interrupting others.

For the male participants, mobile phones are not useful in contacting acquaintances or making new friends, that is, extending their weak-tie relationships. Although the female participants have positive opinion about the relationships, contacts with acquaintances are infrequently. Most of those phone contacts with acquaintances reported in the diaries were related to study, such as group projects, or information about school or club events that were sent to a group of people. There are, however, some cases that mobile phone helped in developing weak ties. One example was that a female participant met a few people at the orientation day. They exchanged mobile phones numbers and kept in touch with each other ever since.

5.2 Do mobile phones help people use the resources in their social network?

Our data, in line with many studies on social relationships, shows that without reasonably good relationships or adequate contacts, our participants may feel uncomfortable to ask for any resources or helps from others. They may also feel being used, if someone, who they have not contact with for a long time, pops in and asks for help. Therefore, maintaining friendships as stated in Section 5.1 becomes critical for them to mobilize resources. Mobile phones are considered as a very important tool for doing this.

For all the participants, mobile phones are a good and the prior way for asking help from friends when needed. For the male participants, it is mainly because that phone contacts were handy since almost everybody has a mobile phone. They would either make a phone call or send a message to friends for help. Most of the females, on the other hand consider SMS as the most appropriate way to asking for help. It is quick and easy; and more importantly, writing instead of speaking allow them thinking about how to express themselves more carefully. Even if been refused, they would not feel too embarrassed. As a participant said:

I wanted to borrow his camera. It’s a very expensive camera. And he is a senior. He could refuse to lend me. If I sent him message, and he said “no”, that’s ok. But if I called him, oh, how bad that could be, I would feel losing face.

There is an interesting kind of help frequently listed in the diaries. Although the all participants use their mobile phone as an alarm in the morning every weekday, some of them also receive “waking up calls” from friends. Some of them make that kind of calls to others. One participant explained:

We had a party the day before (because the participant went back to his hometown from Seoul). He (a friend) went home very late. But he had an important meeting in the next morning. I was worried about him. So I made the call to wake him up. (Why his family, say his dad and mum, did do it?)...His parents went to work at a very early time.... I called his cell phone (mobile phone), because I didn't want to wake others up. And he always has his cell phone with him.

In sum, the use of mobile phones appears to affect social capital of our participants via all three types of mobility (i.e., temporal mobility, spatial mobility and contextual mobility). Proposition 1a, 2a and 3a are confirmed by the data. That is, all temporal, spatial and contextual mobilities are strengthened by mobile phone use. However, Proposition 1b, 2b and 3b are only partly supported. The data show that the mobility enabled by mobile phone use plays positive role in interactions among friends, but is short of contributions for relations among acquaintances. They even suggest a potential negative impact on the participants' relationships with family members.

As for the demographic characteristics, age was controlled in this project. In terms of gender, the impacts of phone use on social capital do different between the female participants and the males. The females are more likely to use mobile phones for strengthening and developing their friendships, while the males might use it to build new relations besides the existing ones. However, no evidence indicates which impact is stronger in changing social capital. No evidence shows differences in mobile phone – social capital caused by social-economic differences among our participants. This might partly because we studied undergrad students in this project. Further investigations among different populations are necessary.

6 DISCUSSION AND CONCLUSION

Social capital is one of the influential concepts in social sciences to understand contemporary societies. It is also increasingly explored in relation to ICT. Using Kakiyama and Sorensen's (2002) analysis of mobility as starting point, we propose six propositions in relation to the impact of ICT on social capital, taking into account the concept of mobility. We, then, employing mobile phones as an example of ICT, conducted a preliminary test of the propositions by means of diary-interview method. The results show that all of time, space and contextual issues matter in mobile phone-social capital interaction. It is confirmed that the changes in social capital caused by mobile phones result from degree of mobility in social interaction obtainable by using them over time.

ICT, including mobile technologies, are developed to extend human communication capability by breaking through the limits, such as time difference and geographical distance, and enables human interaction greater mobility than ever before. As Ling and Haddon (2001) point out, there are three general phases in the way mobility has been coordinated in social interaction. In the first phase, which was the period before telegraphy, communications could only be delivered by human beings. In the second phase, with the development of telegraphy, one could send a message to a remote person without travelling physically. The communication barriers caused by spatial separation were partly resolved, and the speed of messages was many times faster than the speed of physical travel. However, technology-mediated communication in this period required people to access a device at a fixed location in order to send and receive a message. The third phase, which we are now experiencing, removes the condition on fixed locations for the sending and receiving equipment. People who want to send a message are relatively free to choose where they will initiate the communication by using mobile technology, typically mobile phones. In addition, there is no need to know the location of the person whom they wish to contact. Our research further shows that mobility works as medium enabling mobile phones to consolidate individual social capital.

It is also important to understand that mobile phones are not a determinant of social relations or social capital level, but if used properly, they can be a good catalyst in advancing social capital. As indicated by our data, mobile phone use is often resulted in a face-to-face meeting, which creates proximity for

social capital development. Services, especially SMS, are also instruments that make people feel comfortable for seeking helps or sharing resources.

Based on our findings, we believe that mobile phones are potentially helpful in building weak-ties and further increasing social capital. The phone numbers stored in the phonebooks could even serve as a database of potential acquaintances. However, this impact is not strong. Mobile phone communications, different from other forms of communications, are not anonymous. It is not very common for people to contact a number belonging to a totally stranger, not even to somebody who are not familiar to us. Therefore, mobile phones are more likely utilized to strengthen the pre-existing network of an individual.

This study not only enhances our understanding about the interaction between ICT and social capital, but also points out the way to measure this interaction. According to the previous research, one of the greatest challenges in ICT-social capital research is to define exactly what social capital is and to measure it. As social capital theories are diverse in definition, IS scholars should critically apply the social capital in ICT related study. It is important to shed light on the level of analysis in a study and choose an appropriate social capital theory to support the study. It is also critical for researchers conducting ICT-social capital research at the both levels to cope with the methodological issues. Although most scholars employ social networks, trust and norm of reciprocity as key dimensions in measuring social capital, few of them share same understanding about other dimensions of it. One may include information and communication (e.g. World Bank) as one of the dimensions of social capital, others may consider life satisfaction in their measurement. We argue that when considering the impact of ICT on social capital and vice versa at individual level, it is critical to identify the circumstance of the ICT mediated communication, including time, space and other factors, as demonstrated in the study.

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